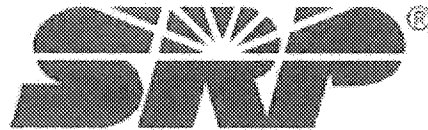


# **Navajo Generating Station Minor New Source Review Permit Application**

**Salt River Project  
1521 North Project Drive  
Tempe, Arizona 85281**



**February 2015**



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**NAVAJO GENERATING STATION**

P.O. Box 850  
Page, AZ 86040  
(928) 645-6217  
Fax (928) 645-7298

**ROBERT K. TALBOT**  
Manager

February 9, 2015

Mr. Gerardo C. Rios, Chief  
Air Division Permits Office (AIR-3)  
EPA Region IX  
75 Hawthorne Street  
San Francisco, CA 94105

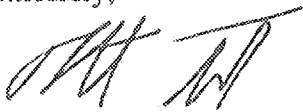
**Re: Minor New Source Review Permit Application**  
**Navajo Generating Station**  
**Permit No. NN-ROP 05-06**

Dear Mr. Rios:

Enclosed is a Minor New Source Review Permit application for the Salt River Project (SRP) Navajo Generating Station's (NGS) air quality permit. This application pertains to the proposed installation of a refined coal treatment system at NGS.

If you have any questions regarding this application submittal, please contact Kyle Heckel at (602) 236-5493 or Paul Ostapuk at (928) 645-6577.

Sincerely,



Robert Talbot, Manager  
Navajo Generating Station

cc w/attachment: Scott Bohning, EPA Region IX  
Charlene Nelson, NNEPA  
Eric Massey, ADEQ (affected state)  
Paul Ostapuk, NGS  
LOC 6-2-6



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## 1.0 Executive Summary

The Navajo Generating Station (NGS) is a pulverized coal steam electric generating facility that is operated by the Salt River Project Agricultural Improvement and Power District (SRP). The facility is located in the Navajo Nation approximately 5 miles east of Page, Arizona.

NGS consists of three generating units, designated as Units 1, 2, and 3, which produce a combined electrical output of 2,250 net megawatts (MW). Units 1, 2, and 3 became operational in stages between 1974 and 1976. While this facility is operated by SRP, it is owned by a consortium of groups which include:

- United States Bureau of Reclamation (24.3 percent);
- SRP (21.7 percent);
- Los Angeles Department of Water and Power (21.2 percent);
- Arizona Public Service Company (14.0 percent);
- Nevada Power (11.3 percent); and
- Tucson Electric Power (7.5 percent).

NGS is a major stationary source of air emissions and operates under Title V Permit Number NN-ROP-05-06 issued by the Navajo Nation Environmental Protection Agency (NNEPA). NGS is in a location designated as attainment or unclassifiable for all criteria pollutants.


With this application, SRP is proposing to install and operate a refined coal treatment system at NGS and is requesting a Minor New Source Review (NSR) permit to authorize the proposed change. SRP has determined that the proposed change will result in an increase in emissions of particulate matter (PM and PM<sub>10</sub>) which exceeds the Federal Minor NSR thresholds defined under Title 40 of the Code of Federal Regulations (40 CFR) §49.153. As a result, the proposed project is considered a minor modification at an existing source and will require a Minor NSR Permit.

The following sections of this application contain all information required under 40 CFR §49.154.

## **2.0 Permit Application Forms**

This section includes:

- Application for New Construction (Form NEW)

	<p><b>United States Environmental Protection Agency</b>  <b>Region IX, Air Division</b>          75 Hawthorne Street          San Francisco, CA 94105          Phone          (415) 947-3579 Fax  <a href="http://www.epa.gov/region9/air/tribal/index.html">http://www.epa.gov/region9/air/tribal/index.html</a></p>	<p><i>Reviewing Authority</i>  <i>Program</i>  <i>Address</i>  <i>Phone</i>  <i>Fax</i>  <i>Web address</i></p>
<p><b>FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY</b></p> <p><b>Application for New Construction</b>          (Form NEW)</p>		
<p><b>Please check all that apply to show how you are using this form:</b></p> <p> <input type="checkbox"/> Proposed Construction of a New Source  <input checked="" type="checkbox"/> Proposed Construction of New Equipment at an Existing Source  <input type="checkbox"/> Proposed Modification of an Existing Source  <input type="checkbox"/> Other – Please Explain         </p>		

**Please submit information to:**

[Reviewing Authority  
 Address  
 Phone]

**A. GENERAL SOURCE INFORMATION**

<p><b>1. (a) Company Name</b>          Salt River Project Agricultural Improvement and Power District</p> <p><b>(b) Operator Name</b>          Salt River Project Agricultural Improvement and Power District</p>		<p><b>2. Source Name</b>          Navajo Generating Station</p>	
<p><b>3. Type of Operation</b>          Fossil Fuel Electric Power Generation</p>		<p><b>4. Portable Source?</b>    <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No  <b>5. Temporary Source?</b> <input type="checkbox"/> Yes    <input checked="" type="checkbox"/> No</p>	
<p><b>6. NAICS Code</b>          221112</p>		<p><b>7. SIC Code</b>          4911</p>	
<p><b>8. Physical Address (home base for portable sources)</b>          5 miles east of Page, Arizona, off U.S. Highway 98</p>			
<p><b>9. Reservation*</b>          Navajo Nation</p>	<p><b>10. County*</b>          Coconino</p>	<p><b>11a. Latitude*</b>          36° 54' 17.633" N</p>	<p><b>11b. Longitude*</b>          111° 23' 18.474" W</p>
<p><b>12a. Quarter Quarter Section*</b></p>	<p><b>12b. Section*</b>          35&amp;36</p>	<p><b>12c. Township*</b>          41</p>	<p><b>12d. Range*</b>          9E</p>

\*Provide all proposed locations of operation for portable sources



**B. PREVIOUS PERMIT ACTIONS** (Provide information in this format for each permit that has been issued to this source. Provide as an attachment if additional space is necessary)

Source Name on the Permit
Navajo Generating Station
Permit Number (XX-XXX-XXXXX-XXXX.XX)
AZ 08-01A
Date of the Permit Action
February 6, 2012

Source Name on the Permit
Navajo Generating Station
Permit Number (XX-XXX-XXXXX-XXXX.XX)
NN-ROP-05-06
Date of the Permit Action
July 3, 2008

Source Name on the Permit
Permit Number (XX-XXX-XXXXX-XXXX.XX)
Date of the Permit Action

Source Name on the Permit
Permit Number (XX-XXX-XXXXX-XXXX.XX)
Date of the Permit Action

Source Name on the Permit
Permit Number (XX-XXX-XXXXX-XXXX.XX)
Date of the Permit Action

### C. CONTACT INFORMATION

<b>Company Contact</b> Salt River Project Agricultural Improvement and Power District		Title
Mailing Address P.O. Box 52025, PAB 352, Phoenix, AZ 85072-2025		
Email Address		
Telephone Number (928) 645-8811	Facsimile Number	
<b>Operator Contact</b> (if different from company contact)		Title
Mailing Address		
Email Address		
Telephone Number	Facsimile Number	
<b>Source Contact</b> Paul Ostapuk		Title O&M Manager, Environmental
Mailing Address P.O. Box 850, Page, AZ 86040		
Email Address Paul.Ostapuk@srpnet.com		
Telephone Number (928) 645-6577	Facsimile Number	
<b>Compliance Contact</b> Kyle Heckel	Title Environmental Engineer	
Mailing Address P.O. Box 52025, PAB 352, Phoenix, AZ 85072-2025		
Email Address Kyle.Heckel@srpnet.com		
Telephone Number (602) 236-5493	Facsimile Number	

#### D. ATTACHMENTS

Include all of the following information (see the attached instructions)

☒ **FORM SYNMIN** - New Source Review Synthetic Minor Limit Request Form, if synthetic minor limits are being requested.

☒ Narrative description of the proposed production processes. This description should follow the flow of the process flow diagram to be submitted with this application.

☒ Process flow chart identifying all proposed processing, combustion, handling, storage, and emission control equipment.

☒ A list and descriptions of all proposed emission units and air pollution-generating activities.

☒ Type and quantity of fuels, including sulfur content of fuels, proposed to be used on a daily, annual and maximum hourly basis.

☒ Type and quantity of raw materials used or final product produced proposed to be used on a daily, annual and maximum hourly basis.

☒ Proposed operating schedule, including number of hours per day, number of days per week and number of weeks per year.

☒ A list and description of all proposed emission controls, control efficiencies, emission limits, and monitoring for each emission unit and air pollution generating activity.

☒ **Criteria Pollutant Emissions** - Estimates of Current Actual Emissions, Current Allowable Emissions, Post-Change Uncontrolled Emissions, and Post-Change Allowable Emissions for the following air pollutants: particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

These estimates are to be made for each emission unit, emission generating activity, and the project/source in total.

☒ **Modeling – Air Quality Impact Analysis (AQIA)**

☒ **ESA (Endangered Species Act)**

☒ **NHPA (National Historic Preservation Act)**

## E. TABLE OF ESTIMATED EMISSIONS

The following tables provide the total emissions in tons/year for all pollutants from the calculations required in Section D of this form, as appropriate for the use specified at the top of the form.

### E(i) – Proposed New Source

Pollutant	Potential Emissions (tpy)	Proposed Allowable Emissions (tpy)	
PM			PM - Particulate Matter PM <sub>10</sub> - Particulate Matter less than 10 microns in size PM <sub>2.5</sub> - Particulate Matter less than 2.5 microns in size SO <sub>x</sub> - Sulfur Oxides NO <sub>x</sub> - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H <sub>2</sub> SO <sub>4</sub> - Sulfuric Acid Mist H <sub>2</sub> S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
PM <sub>10</sub>			
PM <sub>2.5</sub>			
SO <sub>x</sub>			
NO <sub>x</sub>			
CO			
VOC			
Pb			
Fluorides			
H <sub>2</sub> SO <sub>4</sub>			
H <sub>2</sub> S			
TRS			
RSC			

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>(a) Coal cleaning plants (with thermal dryers);</li> <li>(b) Kraft pulp mills;</li> <li>(c) Portland cement plants;</li> <li>(d) Primary zinc smelters;</li> <li>(e) Iron and steel mills;</li> <li>(f) Primary aluminum ore reduction plants;</li> <li>(g) Primary copper smelters;</li> <li>(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;</li> <li>(i) Hydrofluoric, sulfuric, or nitric acid plants;</li> <li>(j) Petroleum refineries;</li> <li>(k) Lime plants;</li> <li>(l) Phosphate rock processing plants;</li> <li>(m) Coke oven batteries;</li> <li>(n) Sulfur recovery plants;</li> <li>(o) Carbon black plants (furnace process);</li> <li>(p) Primary lead smelters;</li> <li>(q) Fuel conversion plants;</li> </ul> | <ul style="list-style-type: none"> <li>(r) Sintering plants;</li> <li>(s) Secondary metal production plants;</li> <li>(t) Chemical process plants</li> <li>(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;</li> <li>(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;</li> <li>(w) Taconite ore processing plants;</li> <li>(x) Glass fiber processing plants;</li> <li>(y) Charcoal production plants;</li> <li>(z) Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, and</li> <li>(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.</li> </ul> |
|--|--|

**E(ii) – Proposed New Construction at an Existing Source or Modification of an Existing Source**

<b>Pollutant</b>	<b>Current Actual Emissions (tpy)</b>	<b>Current Allowable Emissions (tpy)</b>	<b>Post-Change Potential Emissions (tpy)</b>	<b>Post-Change Allowable Emissions (tpy)</b>
<b>PM</b>	See Appendix B for required information			
<b>PM<sub>10</sub></b>				
<b>PM<sub>2.5</sub></b>				
<b>SO<sub>x</sub></b>				
<b>NO<sub>x</sub></b>				
<b>CO</b>				
<b>VOC</b>				
<b>Pb</b>				
<b>Fluorides</b>				
<b>H<sub>2</sub>SO<sub>4</sub></b>				
<b>H<sub>2</sub>S</b>				
<b>TRS</b>				
<b>RSC</b>				

PM - Particulate Matter

PM<sub>10</sub> - Particulate Matter less than 10 microns in sizePM<sub>2.5</sub> - Particulate Matter less than 2.5 microns in sizeSO<sub>x</sub> - Sulfur OxidesNO<sub>x</sub> - Nitrogen Oxides

CO - Carbon Monoxide

VOC - Volatile Organic Compound

Pb - Lead and lead compounds

Fluorides - Gaseous and particulates

H<sub>2</sub>SO<sub>4</sub> - Sulfuric Acid MistH<sub>2</sub>S - Hydrogen Sulfide

TRS - Total Reduced Sulfur

RSC - Reduced Sulfur Compounds

[Disclaimers] The public reporting and recordkeeping burden for this collection of information is estimated to average 20 hours per response, unless a modeling analysis is required. If a modeling analysis is required, the public reporting and recordkeeping burden for this collection of information is estimated to average 60 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

### **3.0 Project Description**

NGS currently operates several belt conveyors, as part of their coal handling operations, which transport coal from railcar unloading operations and coal storage piles to coal pulverizers for subsequent combustion in the boilers. Two of those belt conveyors, BC-8A and BC-8B, transfer coal from the surge bin located in the coal yard to the plant bin located in the power block.

With this application, NGS is proposing to install a refined coal system as part of the coal handling operations at the facility. With the proposed system, untreated coal will be diverted from BC-8A and BC-8B using a conveyor belt plow and transferred to two new Refined Coal Facility (RCF) feed belt conveyors (BC-11A and BC-11B). BC-11A and BC-11B will then transport the untreated coal to two mixing pugmills where calcium bromide and cement kiln dust will be applied. The treated coal will then be transferred onto two RCF product belt conveyors (BC-12A and BC-12B) where it is returned to BC-8A and BC-8B. The refined coal system will be designed to process approximately 3,200 tons of coal per hour.

Calcium bromide will be delivered by truck and stored in an 8,700 gallon storage tank and two 405 gallon day tanks. Cement kiln dust will also be delivered by truck and stored in three 150 ton silos and two 20 ton day bins. The refined coal system will consume approximately 45 gallons per hour of calcium bromide and 4 tons per hour of cement kiln dust.

Particulate emissions from the new coal handling operations will be collected and controlled by two dust collection and filtering systems (DC-12 and DC-13). Additionally, the cement kiln dust silos and day bins will be equipped with baghouses (DC-14 through DC-18).

For reference, a process flow diagram identifying all proposed processing and emission control equipment associated with the refined coal system is contained in Appendix A.

## 4.0 Regulatory Applicability Analysis

### 4.1 PSD and Minor NSR

Because NGS is located in an area classified as attainment or unclassifiable for all criteria pollutants and is located on Tribal Land, the proposed project must be evaluated for applicability to the Federal Prevention of Significant Deterioration (PSD) program as well as the Federal Minor New Source Review (NSR) Program in Indian Country.

The PSD program defines a major stationary source as: (1) any source type belonging to a list of 28 source categories that has a potential to emit (PTE) of 100 tons per year (tpy) or more of any conventional (or criteria) pollutant regulated under the federal Clean Air Act (CAA); or (2) any other source type with a PTE of 250 tpy of any pollutant regulated under the CAA. NGS belongs to one of the 28 listed source categories (fossil-fuel boilers, combinations thereof, totaling more than 250 MMBtu per hour heat input) and is considered an existing major stationary source because the PTE for nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), volatile organic compounds (VOC), and particulate matter less than 10 microns in diameter (PM<sub>10</sub>) exceeds 100 tpy.

Under the PSD program, for an existing major stationary source, a modification is considered major if the net emissions increase is equal to or greater than the corresponding significant emissions increase threshold for each respective pollutant, as defined in 40 CFR 51.166(b)(23).

Under the Minor NSR program, for an existing major stationary source, a modification is considered a minor modification if it is not subject to the PSD program but has a net emissions increase that is equal to or greater than the corresponding minor NSR thresholds for each pollutant, as defined in 40 CFR 49.153 Table 1.

Information related to the net emissions increase at NGS for the pollutants affected by the project are listed in Table 4.1. Based on the changes proposed, the project is not considered a major modification under the PSD program. The proposed project however is subject to the minor NSR program, as it exceeds the minor NSR thresholds for PM and PM<sub>10</sub>.

**Table 4.1: Net Emissions Increase and PSD and Minor NSR Applicability Analyses**

Pollutant	Net Emissions Increase* (tpy)	PSD Significance Level (tpy)	PSD?	Minor NSR Threshold (tpy)	Minor NSR?
PM	13.88	25	No	10	Yes
PM <sub>10</sub>	9.88	15	No	5	Yes
PM <sub>2.5</sub>	0.74	10	No	3	No

\*Net emission increase methodology contained in Section 5. Detailed calculations are provided in Appendix B of this application.

NGS is submitting this application in accordance with the Minor NSR permitting requirements under 40 CFR Part 49.154.

## **4.2 NSPS Subpart Y**

New Source Performance Standard (NSPS) Subpart Y (Coal Preparation and Processing Plants) is applicable to various affected facilities, which have commenced construction after October 27, 1974, located at coal preparation and processing plants that process more than 200 tons of coal per day. Per 40 CFR 60.251(e), coal preparation and processing plant is defined as “*any facility (excluding underground mining operations) which prepares coal by one or more of the following processes: breaking, crushing, screening, wet or dry cleaning, and thermal drying*”. NGS receives its coal pre-processed and does not prepare coal using any breaking, crushing, screening, wet or dry cleaning, and thermal drying process. As a result, NGS is not considered a coal preparation and processing plant and the proposed coal handling equipment associated with the proposed project are not subject to NSPS Subpart Y.

## **4.3 Air Quality Impact Analysis**

The Minor NSR regulations under 40 CFR 49.154(d) indicate that an air quality impact analysis (AQIA) may be required if the reviewing authority has reason to be concerned that the construction of the project would cause or contribute to a NAAQS or PSD increment violation. For the proposed project, an AQIA analysis was conducted for PM<sub>10</sub> and PM<sub>2.5</sub>. Since there is no NAAQS or PSD increment for PM, it was not included in the AQIA.

Results of the AQIA indicated that the maximum concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> resulting from the project are below their respective Significant Impact Levels (SILs). Therefore, the proposed project will not cause or contribute to a NAAQS or PSD increment violation. Details of the methodologies used in the AQIA and the results are included in the Refined Coal Project Modeling Protocol and Report contained in Appendix C.

## **4.4 Endangered Species Act**

The Endangered Species Act of 1973 requires the examination of impacts to all federally listed threatened or endangered species and designated critical habitat caused by the proposed federal action in the action area. As discussed in Section 4.3, a modeling analysis was conducted to identify the maximum concentration of PM<sub>10</sub> and PM<sub>2.5</sub> resulting from the proposed project. The results from the model identified that the maximum concentration occurs at the property fence line and is below the SILs for PM<sub>10</sub> and PM<sub>2.5</sub>. Since emissions from the project are considered insignificant beyond the property fence line, the project (action) area for this evaluation was limited to the NGS property boundaries.

According to the United States Fish and Wildlife Service, there are 21 species in Coconino County that are listed as endangered, threatened, or candidate species (Table 4.2). There is no



designated critical habitat within the project area. Based on the habitat conditions surrounding the project area, the only species from the Coconino County threatened and endangered species list expected to be in the vicinity of the project area is the California condor (*Gymnogyps californianus*). The California condor has been observed in Page, Arizona, and at Wahweap Marina, both approximately 5 miles west of the project area. No breeding or nesting was observed. California condors have not been observed within the NGS property boundary. NGS is a developed site that lacks breeding and foraging habitat for the species. Because no species from the threatened or endangered species list are expected to occur within the project area and no critical habitat is designated within the project area, no impacts to listed species or critical habitat are anticipated from the proposed project.

**Table 4.2: Coconino County List of Threatened and Endangered Species**

Group	Name	Status
Amphibians	Chiricahua leopard frog ( <i>Rana chiricahuensis</i> )	Threatened
Birds	California condor ( <i>Gymnogyps californianus</i> )	Endangered; Experimental Population, Non-Essential
Birds	Yellow-billed Cuckoo ( <i>Coccyzus americanus</i> )	Threatened
Birds	Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	Threatened
Birds	Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	Endangered
Fishes	Humpback chub ( <i>Gila cypha</i> )	Endangered
Fishes	Apache trout ( <i>Oncorhynchus apache</i> )	Threatened
Fishes	Roundtail chub ( <i>Gila robusta</i> )	Candidate
Fishes	Little Colorado spinedace ( <i>Lepidomeda vittata</i> )	Threatened
Fishes	Razorback sucker ( <i>Xyrauchen texanus</i> )	Endangered
Flowering Plants	Fickeisen plains cactus ( <i>Pediocactus peeblesianus fickeiseniae</i> )	Endangered
Flowering Plants	Sentry milk-vetch ( <i>Astragalus cremnophylax</i> var. <i>cremnophylax</i> )	Endangered
Flowering Plants	Navajo sedge ( <i>Carex specuicola</i> )	Threatened
Flowering Plants	Brady pincushion cactus ( <i>Pediocactus bradyi</i> )	Endangered
Flowering Plants	Siler pincushion cactus ( <i>Pediocactus (=Echinocactus, =Utahia) sileri</i> )	Threatened
Flowering Plants	San Francisco Peaks ragwort ( <i>Packera franciscana</i> )	Threatened
Flowering Plants	Welsh's milkweed ( <i>Asclepias welshii</i> )	Threatened
Mammals	Black-footed ferret ( <i>Mustela nigripes</i> )	Endangered; Experimental Population, Non-Essential
Reptiles	Northern Mexican gartersnake ( <i>Thamnophis eques megalops</i> )	Threatened
Reptiles	Narrow-headed garter snake ( <i>Thamnophis rufipunctatus</i> )	Threatened
Snails	Kanab ambersnail ( <i>Oxyloma haydeni kanabensis</i> )	Endangered

#### **4.5 National Historic Preservation Act**

The National Historic Preservation Act requires that an evaluation of the project be conducted to ensure that there will be no impacts to cultural resources. For the proposed project, there will be no new land disturbances, as construction will occur only within the boundaries of the plant proper fence line on pre-disturbed land. NGS conducted an archeological evaluation of the entire plant site prior to construction of the facility in which there were no archeological findings<sup>1</sup>. With there being no new land disturbances, and the pre-disturbed land having been historically evaluated with no findings, no impacts to cultural resources are expected as a result of the proposed project.

#### **4.6 Air Permit Status**

NGS currently operates under a Title V permit (Permit Number NN-ROP-05-06) issued by Navajo Nation Environmental Protection Agency (NNEPA). The expiration date for this permit was July 3, 2013 unless a timely and complete renewal application was submitted at least 6 months, but not more than 18 months, prior to the date of expiration of the permit. SRP submitted a complete renewal application for this permit on January 3, 2012, which was within the specified timeframe for renewal application submittal. The NNEPA is currently processing the renewal application.

#### **4.7 Compliance Status**

SRP is currently in compliance with its air quality permit for NGS and will meet any additional applicable requirements that become effective during the permit term in a timely manner.

---

<sup>1</sup> Navajo Project Archeological Clearance, February 25, 1970, L.M. Alexander.

## 5.0 Emission Calculations

Several new emission sources will be installed as part of the proposed project. The new emission units are sources of particulate matter (PM, PM<sub>10</sub>, and PM<sub>2.5</sub>) and include the following:

- Dust collectors for coal handling operations (DC-12 and DC-13)
- Cement kiln dust silo baghouses (DC-14, DC-15, and DC-16)
- Cement kiln dust day bin baghouses (DC-17 and DC-18)
- Unpaved road emissions from cement kiln dust and calcium bromide deliveries

Additionally, the cement kiln dust being applied to the coal is expected to increase the ash content of the coal that is combusted in the boilers. As a result, an increase in actual emissions of PM, PM<sub>10</sub>, and PM<sub>2.5</sub> from the boilers (U1, U2, and U3), which will be combusting the treated coal, is anticipated.

This section provides a summary of the methodologies used to calculate the potential emissions for the new sources, the increase in actual emissions from the affected sources, and the total net emissions increase resulting from the proposed project. Because NGS is not seeking an increase in potential emissions from existing sources, and potential emissions from existing sources are not necessary for evaluating applicability to the PSD and Minor NSR programs, they are not included in this evaluation.

### 4.1 New Emission Sources

#### 4.1.1 Dust Collectors (DC-12 and DC-13)

The proposed project includes the installation of several coal belt conveyors, which will be controlled by two dust collectors. Potential emissions from the dust collectors are calculated using flow rate and particulate grain loading rates for standard filters based on manufacturer specification data and assuming 8,760 hours of operation per year. Detailed emission calculations for the dust collectors are included in Table B.1 of Appendix B. The potential emissions calculated in Table B.1 are subsequently used in the net emission increase evaluation used for PSD and Minor NSR applicability determinations.

While the potential emissions used in the net emissions increase evaluation are calculated using particulate grain loading rates for the standard filters that are considered integral to the operation of the system, NGS is voluntarily planning to install high efficiency filters. Detailed emission calculations using the high efficiency filters are included in Table B.2 of Appendix B.

#### 4.1.2 Baghouses (DC-14 through DC-18)

The proposed project also includes the installation of three silos and two day bins for storing cement kiln dust. PM emissions from the storage silos and day bins will be controlled by

baghouses that are considered integral to the systems operation. Potential emissions for the baghouses are calculated using flow rate and particulate grain loading rates based on manufacturer specification data and assuming 8,760 hours of operation per year. Detailed emission calculations for the baghouses are included in Table B.1 of Appendix B.

#### **4.1.3 Unpaved Roads**

As part of the proposed project, the refined coal operation will receive regular deliveries of calcium bromide and cement kiln dust. The delivery trucks will drive on unpaved roads located within the property boundary, which will be a source of fugitive particulate matter emissions. Potential emissions from the unpaved roads were calculated using vehicle specific information and emission factors from AP-42 Section 13.2.2 (Fugitive Dust from Vehicles Traveling on Unpaved Roads). Detailed emission calculations for the unpaved road fugitive emissions are included in Table B.3 of Appendix B.

### **4.2 Existing Affected Emission Sources**

Because the proposed project will be applying cement kiln dust to the coal, the ash content of the coal is expected to increase. Consequently, an increase in actual emissions of PM, PM<sub>10</sub>, and PM<sub>2.5</sub> from the boilers that will be combusting the treated fuel is anticipated. Emission factors representing the increase in emissions from the additional ash content were calculated using the increase in ash content due to the application of cement kiln dust and methodologies contained in AP-42 Section 1.1 (Bituminous and Subbituminous Coal Combustion).

To identify the net increase in emissions, the emission factors for the increased ash content were multiplied by the average historic coal combustion rate for each unit over the 24-month period of January 2012 through December 2013. NGS does not anticipate that there will be an increase in annual coal combustion rates as a result of this project. As a result, the net emissions increase evaluation is consistent with the actual-to-projected-actual evaluations required for determining applicability to the PSD and Minor NSR programs. Detailed emission calculations for the affected sources are included in Tables B.4 and B.5 of Appendix B.

### **4.3 Net Emissions Increase**

The net emissions increase from the proposed project was calculated by summing the potential to emit for each new source and the increase in emissions from the existing affected emission sources. The total net emissions increase from the project is included in Table B.6 of Appendix B. The total net emissions increase from this evaluation was used for PSD and Minor NSR applicability determinations, as detailed in Section 4.1.

Because NGS is voluntarily planning to install high efficiency filters on the dust collectors, a separate net emissions increase summary, using the high efficiency filters, is provided in Table B.7 of Appendix B. The emission rates included in Table B.7 are used in the AQIA.

# **APPENDIX A**

## **Process Flow Diagram**



## **APPENDIX B**

### **Emission Calculations**

Table B.1: Emissions from Dust Collection Systems

Emission Point	Description	Control Device	Flow Rate (acfm)	PM EF <sup>1</sup>	PM <sub>10</sub> EF <sup>1</sup>	PM <sub>2.5</sub> EF <sup>1</sup>	PM Emissions		PM <sub>10</sub> Emissions		PM <sub>2.5</sub> Emissions	
				(gr/acf)	(gr/acf)	(gr/acf)	(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>	(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>	(lb/hr) <sup>2</sup>	(tons/yr) <sup>3</sup>
Coal Handling												
DC-12	Coal Handling Dust Collection System	Dust Collector	16,500	1.00E-02	1.00E-02	5.50E-04	1.4143	6.19	1.4143	6.19	0.0750	0.3283
DC-13	Coal Handling Dust Collection System	Dust Collector	6,000	1.00E-02	1.00E-02	5.50E-04	0.5143	2.25	0.5143	2.25	0.0273	0.1194
Cement Kiln Dust Handling												
DC-14	Cement Kiln Dust Silo 1	Baghouse	450	2.50E-04	2.50E-04	1.33E-05	0.0010	0.004	0.0010	0.004	0.0001	0.0002
DC-15	Cement Kiln Dust Silo 2	Baghouse	450	2.50E-04	2.50E-04	1.33E-05	0.0010	0.004	0.0010	0.004	0.0001	0.0002
DC-16	Cement Kiln Dust Silo 3	Baghouse	450	2.50E-04	2.50E-04	1.33E-05	0.0010	0.004	0.0010	0.004	0.0001	0.0002
DC-17	Cement Kiln Dust Day Bin 1	Baghouse	1,200	2.00E-03	2.00E-03	1.06E-04	0.0206	0.09	0.0206	0.090	0.0011	0.0048
DC-18	Cement Kiln Dust Day Bin 2	Baghouse	1,200	2.00E-03	2.00E-03	1.06E-04	0.0206	0.09	0.0206	0.090	0.0011	0.0048
Total Emissions from Dust Collection Systems							1.97	8.64	1.97	8.64	0.10	0.46

1) Emission factors based on manufacturers' data (see Appendix D) and assuming 5.3% PM2.5 (EPA AP-42 page 13.2.4-4)

2) Emissions (lb/hr) = Flow Rate (acfm) x Emission Factor (gr/acf) x (lb/7,000 gram) x (60 min/hr)

3) Emissions (tons/yr) = Emissions (lb/hr) x 8,760 hr/yr x (1 ton/2,000 lb)



Table B.2: Emissions from Dust Collection Systems w/ High Efficiency Filters

Emission Point	Description	Control Device	Flow Rate (acfm)	PM EF <sup>1</sup> (gr/acft)	PM <sub>10</sub> EF <sup>1</sup> (gr/acft)	PM <sub>2.5</sub> EF <sup>1</sup> (gr/acft)	PM Emissions (lb/hr) <sup>2</sup>	PM <sub>10</sub> Emissions (tons/yr) <sup>3</sup>	PM <sub>2.5</sub> Emissions (tons/yr) <sup>3</sup>
<b>Coal Handling</b>									
DC-12	Coal Handling Dust Collection System	Dust Collector	16,500	3.00E-03	3.00E-03	1.59E-04	0.4243	1.86	0.0225
DC-13	Coal Handling Dust Collection System	Dust Collector	6,000	3.00E-03	3.00E-03	1.59E-04	0.1543	0.68	0.0082
<b>Total Emissions from Dust Collection Systems</b>							<b>0.58</b>	<b>2.53</b>	<b>0.03</b>

1) Emission factors based on manufacturers' data for high efficiency filters (see Appendix D) and assuming 99% PM2.5 (EPA AP-42, page 13.2.4-4)

2) Emissions (lb/hr) = Flow Rate (acfm) x Emission Factor (gr/acft) x (lb/7,000 grain) x (60 min/hr)

3) Emissions (tons/yr) = Emissions (lb/hr) x 8,760 hr/yr x (1 ton/2,000 lb)

Table B.3: Unpaved Road Emissions

Random Unit ID	Unit Description	Weight per Vehicle (tons)	VMTRound Trip	Total Annual Delivers	Max VMT/hr	Total VMT/Year	PM <sub>10</sub> Emission Factor (lb/VMT) <sup>3</sup>	PM <sub>2.5</sub> Emission Factor (lb/VMT) <sup>3</sup>	PM <sub>10</sub> Emissions (lb/hr) <sup>3</sup>	PM <sub>2.5</sub> Emissions (lb/hr) <sup>3</sup>	PM <sub>10</sub> Emissions (tons/yr) <sup>4</sup>	PM <sub>2.5</sub> Emissions (tons/yr) <sup>4</sup>
TR	Cement Kiln Dust Deliveries	74	1.0	720	1.0	720	2.85	0.07	2.55	1.0	0.7	0.3
TR	Calcium Bromide Deliveries	33	1.0	70	1.0	70	1.98	0.05	1.98	0.1	0.5	0.02
Total							4.83	1.09	1.25	0.28	0.12	0.03

1) Assume average half full.

2) Emission factors based on AP-42, Section 13.2.2 (11-C) - Fugitive Dust From Vehicles Traveling on Unpaved Roads

$$E_{PM_{10}} \text{ (lb/VMT)} = k_p/12 \cdot (W/3)^{1/4} (100\% - CE), \text{ where } k=4.9, a=0.7, b=0.45$$

$$E_{PM_{2.5}} \text{ (lb/VMT)} = k_p/12 \cdot (W/3)^{1/4} (100\% - CE), \text{ where } k=1.5, a=0.6, b=0.45$$

$$E_{PM_{10}} \text{ (lb/VMT)} = k_p/12 \cdot (W/3)^{1/4} (100\% - CE), \text{ where } k=0.15, a=0.9, b=0.45$$

$$g = \text{surface material silt content (\%)} = 5.1 \text{ (from Table 13.2.2-1)}$$

$$W = \text{mean vehicle weight (tons)}$$

$$CE = \text{control efficiency from road watering (75\% from Figure 13.2.2-2, assuming a misting ratio of 2)}$$

$$3) PM_{10}/PM_{2.5} \text{ Potential to Emit (lb/hr)} = \text{Total Vehicle Miles Traveled per Year (VMT/yr)} \times PM_{10}/PM_{2.5} \text{ Emission Factor (lb/VMT)} \times (1 \text{ yr} / 8,760 \text{ hrs})$$

$$4) PM_{10}/PM_{2.5} \text{ Potential to Emit (ton/yr)} = \text{Total Vehicle Miles Traveled per Year (VMT/yr)} \times PM_{10}/PM_{2.5} \text{ Emission Factor (lb/VMT)} \times (1 \text{ ton} / 2,000 \text{ lbs})$$

**Table B.4: Emission Increase from Existing EGUs - Emission Factors**

Coal Feed Rate - Unit 1 <sup>1</sup>	264.87	tons/hr
Coal Feed Rate - Unit 2 <sup>1</sup>	252.46	tons/hr
Coal Feed Rate - Unit 3 <sup>1</sup>	271.59	tons/hr
Coal Ash Percentage Increase w/ Cement Kiln Dust	0.4	% by wt
Electrostatic Precipitator (ESP) Control Efficiency <sup>2</sup>	99.5	%
Flue Gas Desulfurizer (FGD) Control Efficiency <sup>3</sup>	94	%
Emission Factor: PM increase w/CKD, Controlled <sup>4</sup>	0.0012	lb/ton <sub>Coal</sub>
Emission Factor: PM <sub>10</sub> increase w/CKD, Controlled <sup>4</sup>	0.0003	lb/ton <sub>Coal</sub>
Emission Factor: PM <sub>2.5</sub> increase w/CKD, Controlled <sup>4</sup>	0.0001	lb/ton <sub>Coal</sub>

1) Coal feed rates based on hourly averages for the time period of 1/1/2012 thru 12/31/2013

2) ESP control efficiency based on manufacturer specifications

3) FGD control efficiency based on EPA AP-42, Section 1.1, Table 1.1-6 control efficiency for scrubber

4) Controlled Emission Factors calculated using the following uncontrolled factors from EPA AP-42, Section 1.1, Table 1.1-6

PM: 10A

PM<sub>10</sub>: 2.3A

PM<sub>2.5</sub>: 0.6A

Where A = Coal Ash Percentage

Controlled Emission Factor (lb/ton<sub>coal</sub>) = Uncontrolled Factor (lb/ton<sub>coal</sub>) \* (1 - ESP control efficiency) \* (1 - FGD control efficiency)

**Table B.5: Emission Increase from Existing EGUs - Analysis**

	PM		PM <sub>10</sub>		PM <sub>2.5</sub>	
	lb/hr <sup>1</sup>	tpy <sup>2</sup>	lb/hr <sup>1</sup>	tpy <sup>2</sup>	lb/hr <sup>1</sup>	tpy <sup>2</sup>
Unit 1	0.3	1.39	0.1	0.32	0.0	0.08
Unit 2	0.3	1.33	0.1	0.31	0.0	0.09
Unit 3	0.3	1.43	0.1	0.33	0.0	0.09
<b>Total</b>	<b>0.9</b>	<b>4.1</b>	<b>0.2</b>	<b>1.0</b>	<b>0.1</b>	<b>0.3</b>

1) PM/PM<sub>10</sub>/PM<sub>2.5</sub> Hourly Emissions (lb/hr) = Max Fuel Consumptions (tons/hr) x PM/PM<sub>10</sub>/PM<sub>2.5</sub> Emission Factor (lb/ton<sub>coal</sub>)

2) PM/PM<sub>10</sub>/PM<sub>2.5</sub> Annual Emissions (tons/yr) = PM/PM<sub>10</sub>/PM<sub>2.5</sub> Hourly Emissions (lb/hr) x (8,760 hours/year) x (1 ton / 2,000 lbs)

Table B.6: Emission Summary Table - Net Emission Increase

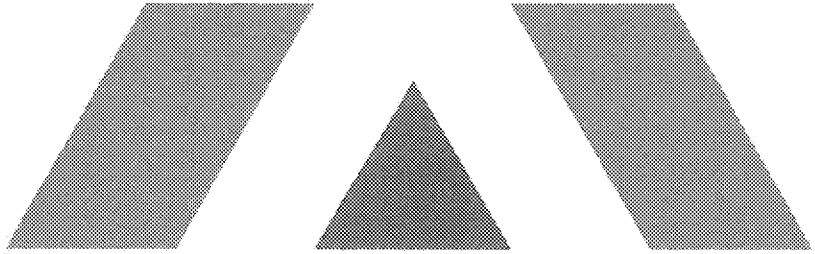
Source	Unit Description	PM		PM <sub>10</sub>		PM <sub>2.5</sub>	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
New Sources							
DC-12	Coal Handling Dust Collection System	1.41	6.19	1.41	6.19	0.07	0.33
DC-13	Coal Handling Dust Collection System	0.51	2.25	0.51	2.25	0.03	0.12
DC-14	Cement Kiln Dust Silo 1	0.00	0.00	0.001	0.004	0.0001	0.0002
DC-15	Cement Kiln Dust Silo 2	0.00	0.00	0.001	0.004	0.0001	0.0002
DC-16	Cement Kiln Dust Silo 3	0.00	0.00	0.001	0.004	0.0001	0.0002
DC-17	Cement Kiln Dust Day Bin 1	0.02	0.09	0.02	0.09	0.00	0.00
DC-18	Cement Kiln Dust Day Bin 2	0.02	0.09	0.02	0.09	0.00	0.00
TR	Cement Kiln Dust Deliveries	2.85	1.03	0.73	0.26	0.07	0.03
TR	Calcium Bromide Deliveries	1.98	0.07	0.51	0.02	0.05	0.00
Affected Sources - Emission Increase							
U1	Boiler 1	0.32	1.39	0.07	0.32	0.02	0.08
U2	Boiler 2	0.30	1.33	0.07	0.31	0.02	0.09
U3	Boiler 3	0.33	1.43	0.07	0.33	0.02	0.09
Net Emission Increase		7.75	13.88	3.44	9.88	0.29	0.74

Table B.7: Emission Summary Table w/ High Efficiency Filters on Dust Collection Systems

Source		Unit Description	PM		PM <sub>10</sub>		PM <sub>2.5</sub>	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
New Sources								
DC-12	Coal Handling Dust Collection System	Coal Handling Dust Collection System	0.42	1.86	0.42	1.86	0.02	0.10
DC-13		Coal Handling Dust Collection System	0.15	0.68	0.15	0.68	0.01	0.04
DC-14		Cement Kiln Dust Silo 1	0.001	0.004	0.001	0.004	0.0001	0.0002
DC-15		Cement Kiln Dust Silo 2	0.001	0.004	0.001	0.004	0.0001	0.0002
DC-16		Cement Kiln Dust Silo 3	0.001	0.004	0.001	0.004	0.0001	0.0002
DC-17		Cement Kiln Dust Day Bin 1	0.02	0.09	0.02	0.09	0.00	0.00
DC-18	Cement Kiln Dust Day Bin 2	Cement Kiln Dust Day Bin 2	0.02	0.09	0.02	0.09	0.00	0.00
TR	Cement Kiln Dust Deliveries	Cement Kiln Dust Deliveries	2.85	1.03	0.73	0.26	0.07	0.03
TR	Calcium Bromide Deliveries	Calcium Bromide Deliveries	1.98	0.07	0.51	0.02	0.05	0.00
Affected Sources - Emission Increase								
U1	Boiler 1 Boiler 2 Boiler 3	Boiler 1	0.32	1.39	0.07	0.32	0.02	0.08
U2		Boiler 2	0.30	1.33	0.07	0.31	0.02	0.09
U3		Boiler 3	0.33	1.43	0.07	0.33	0.02	0.09
Net Emission Increase			6.40	7.97	2.09	3.96	0.22	0.43

## **APPENDIX C**

### **Refined Coal Project Air Dispersion Modeling Protocol and Report**



**AIR DISPERSION MODELING PROTOCOL AND REPORT**  
Refined Coal Project  
Salt River Project - Navajo Generating Station

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January 2015

Project 140301.0104

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# 1. INTRODUCTION

The Salt River Project Agricultural Improvement and Power District (SRP) operates the Navajo Generating Station (NGS) located approximately five miles east of Page in Coconino County, Arizona. The facility is classified as a major source with respect to PSD and Title V regulations.

SRP is planning to install a refined coal system as part of the coal handling operations at the facility. As part of this project, additional particulate matter (including  $PM_{10}$  and  $PM_{2.5}$ ) emissions will be generated from various sources (e.g., unpaved roads, dust collectors, silos, etc.). No direct increase in emissions for any other criteria pollutants are expected from the project. Since NGS is located on tribal land, the proposed project will be subject to the EPA's Tribal Land Minor New Source Review (NSR) program. Based on the projected emission rate increase associated with the project, SRP is required to submit an air quality permit application pursuant to the procedures of Title 40 of the Code of Federal Regulations (40 CFR) § 49.154 for a minor modification at an existing source. As part of the project, an Air Quality Impact Analysis (AQIA) may be requested by the EPA to demonstrate that the proposed project will not cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS) or PSD Increment.

This document presents an air quality modeling analysis to support the minor NSR permit application for the refined coal project. This report is prepared in accordance with the U.S. EPA Air Quality Modeling Guidelines<sup>1</sup> and describes the methodology followed and the results of the air quality impact analysis.

Impacts have been determined using the latest version of the American Meteorological Society (AMS) / Environmental Protection Agency (EPA) Regulatory Model, known as AERMOD.

## 1.1. NGS SITE LOCATION & AREA CLASSIFICATION

NGS is located approximately five miles east of Page in Coconino County, Arizona, which has the following classification relative to the NAAQS:<sup>2</sup>

- Attainment for:
  - Particulate matter (PM) or total suspended particulates (TSP); and
  - Sulfur dioxide ( $SO_2$ )
- Unclassifiable for:
  - Particulate matter with an aerodynamic diameter less than 10 microns ( $PM_{10}$ );
  - Particulate matter with an aerodynamic diameter less than 2.5 microns ( $PM_{2.5}$ );
  - Carbon monoxide (CO);
  - Ozone;
  - Nitrogen dioxides ( $NO_2$ ); and
  - Lead (Pb)

Figure 1-1 provides the general location of the site with respect to the state of Arizona as well as surrounding cities and highways. An aerial photograph of NGS is provided in Figure 1-2, which also shows the fenceline for the site with respect to the surrounding area. Figures 1-3 and 1-4 are plot plans that show the location of the modeled emission sources and buildings/structures considered for downwash analysis. Note that all coordinates presented in the figures are established using the Universal Transverse Mercator (UTM) WGS84 coordinate system.

<sup>1</sup> Code of Federal Regulations, Title 40-Protection of the Environment, Part 51, Appendix W.

<sup>2</sup> Per 40 CFR §81.303.

**Figure 1-1. NGS Location Map**

